R E P O R T R E S U M E S

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AN EXPERIMENTAL PROJECT TO MEASURE CERTAIN FACETS OF LANGUAGE GROWTH FOR HIGH SCHOOL STUDENTS IN BEGINNING FRENCH WHEN VARIATIONS OF LANGUAGE LABORATORY EQUIPMENT ARE UTILIZED IN THE INSTRUCTIONAL PROCESS. FINAL REPORT.

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THIS EXPERIMENT COMPARED MERITS OF FOUR COMBINATIONS OF AUDIO-ACTIVE, AND RECORD-PLAYBACK ARRANGEMENTS IN HIGH SCHOOL FRENCH LANGUAGE LABORATORIES FOR 120 SOPHOMORES MATCHED ON FIVE PREDICTIVE MEASURES. ACHIEVEMENT TEST SCORES, GRADES, AND RATINGS BY THREE INDEPENDENT JUDGES WERE STATISTICALLY ANALYZED. BEST PERFORMANCE WAS ACHIEVED BY THE EXPERIMENTAL GROUP SPENDING 80 PERCENT OF THE TIME USING AUDIO-ACTIVE EQUIPMENT ONLY. IMPLICATIONS FOR OPTIMUM USE OF LANGUAGE LABORATORIES WERE DISCUSSED. REQUESTS FOR THIS REPORT SHOULD BE ADDRESSED TO--MR. EDWARD TRACY, SUPERINTENDENT OF SCHOOLS, EASTON AREA SCHOOL SYSTEM, EASTON, PENNSYLVANIA. (LH)

ED016408

A FINAL REPORT

For

A RESEARCH PROJECT ENTITLED

"An Experimental Project to Measure Certain Facets of Language Growth for High School Students in Beginning French When Variations of Language Laboratory Equipment Are Utilized in the Instructional Process"

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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LETTER OF TRANSMITTAL

The Chief, Research Section
Educational Media Branch
Office of Education
Department of Health, Education,
and Welfare
Washington 25, D. C.

Dear Sir:

This is the final report of a Research Project, Grant No: 736148, entitled "An Experimental Project to Measure Certain Facets of Language Growth for High School Students in Beginning French When Variations of Language Laboratory Equipment Are Utilized in the Instructional Process." This project was supported with funds provided by the Department of Health, Education, and Welfare under the provisions of Title VII of the National Defense Education Act, and funds from the Easton Area Joint High School System. The Bureau of Research, Department of Public Instruction, Commonwealth of Pennsylvania, Harrisburg, contributed its services in coordinating the project.

We are grateful to the U.S. Office of Education for the opportunity to conduct such a project at the secondary school level. Such a project should provide encouragement to other secondary schools to conduct scientific research and eventually bring about greater use of scientific inquiry into the educational program of secondary school education.

Sincerely yours,

CHARLES H. BOEHM
Superintendent of
Public Instruction

EDWARD TRACY
Superintendent of
Easton Area Schools

ACKNOWLEDGMENTS

CHARLES H. BOEHM
State Superintendent of Schools
Harrisburg, Pennsylvania

EDWARD TRACY
Superintendent of Schools
Easton, Pennsylvania

Dear Doctor Boehm and Mr. Tracy:

It has been a privilege to serve as the State's Coordinator for this cooperative research project with the Easton Area Joint High School System. I would like to call your attention to the major contributions of the key personnel in this project.

Mr. Nicholas Cericcla, Director of Audio-Visual Education and Project Coordinator at Easton, had a major role in this project by establishing the operational pattern at Easton, coordinating the instructional program and handling the necessary details of the student evaluations by the three judges. The successful implementation of this project at Easton was due to the efforts of Mr. Cericola.

Dr. Hugh M. Davison, Professor of Educational Research, The Pennsylvania State University and Chief Research Consultant, provided the essential research design procedures and directed the statistical processes utilized in the experiment.

Dr. Carl D. Morneweck, Director of Research for the Department of Public Instruction, was largely responsible for the initial structure of the research proposal.

Mr. Emanuel Berger, Research Specialist for the Department of Public Instruction, was a major contributor in synthesizing and preparing the statistical data for the final report.

Dr. Robert B. Hayes, Research Supervisor for the Department of Public Instruction, was helpful in the analysis of the statistical data.

Dr. Alfred D. Roberts, Chairman, Department of Foreign Languages at West Chester State College; *Dr. Mario Maurin,* Chairman, Department of French, Bryn Mawr College; and *Dr. Samuel Pascal,* Professor of Languages, Lafayette College, served as judges for the project. Their strict attention to the procedural arrangements facilitated the tabulation of data.

Mrs. Isabel Petro, teacher in the project, was most diligent and critical in her day to day preparation of lessons. Her objective approach to the experiment gives added strength to the statistical results.

I believe that the results of this investigation will give additional direction to schools planning the utilization of language laboratories in secondary schools. This project points to an emerging theory that language laboratories must be considered in terms of the total school program rather than the foreign language department of a secondary school.

One of the most valuable results was the experience afforded in conducting cooperative research involving the State Department of Public Instruction and a local school system.

It is my hope that further cooperative efforts such as the Easton project will give new emphasis to local, State, and Federal Cooperation.

Sincerely yours,

JOHN N. BUCH

INTRODUCTION

The School

The Easton Area High School is a new and modern high school which was opened in September of 1961. The school has a capacity of 1,800 students in grades 10 through 12 and a professional staff of 90. The school is unusual for the general area in that it functions as three schools in one. Each grade is housed in its own wing and has its own grade level principal and its own guidance counselor and secretary. These three "schools" function under the authority and direction of a head principal who is responsible to the superintendent of schools. A strong college preparatory program serves those (one out of each three students) who elect to follow this curriculum. A wide variety of course offerings plus a vocational technical program permit the use of the term "comprehensive high school" when viewing the total high school program.

The Community

The City of Easton is located along the eastern boundary of Pennsylvania at the junction of the Delaware and Lehigh Rivers. The city is situated in a greatly diversified industrial and recreational region. A network of highways makes Easton easily accessible to the cultural centers of Philadelphia and New York. This serves as an impetus for strengthening local cultural opportunities. The existence of both public and private colleges within commuting distance also adds to enrichment of the community environment.

THE PROBLEM

Statement of the Problem

This experimental project was undertaken to measure certain facets of language growth for high school students in beginning French when variations of language laboratory equipment are utilized in the instructional process.

The historical pattern of teaching a foreign language revealed that instructional processes were directed toward grammar, reading, and writing. Immediate needs for foreign language proficiency during World War II directed instructional procedures toward the speaking and listening phases of language development. This redirection of emphasis in language development became known as the oral-aural approach in language instruction, which in essence was nothing more than emphasizing speaking and listening. Early developments at the college and university level made use of laboratory sessions in which students listened to recordings, used wire recorders, tape recorders, and records. In some instances, students received a laboratory-type experience with a teacher competent in providing the pronunciation skills of the language being taught. During the 1950's the terminology changed from oral-aural to audio-lingual, and laboratory equipment innovations developed in three directions: (1) The audio-passive — usually a system with earphones connected to a record player and used for listening only; (2) The audio-active — a system whereby the student is able to listen and respond. In this system a microphone is attached to the earphones in order that the student may hear his own voice through the earphones; (3) The audio-active-record — similar to the audio-active except that a tape recorder is located in each student position.

Educators generally agree that the audio-lingual approach to the teaching process of modern foreign languages has been enhanced and advanced by the proper utilization of the language laboratory. However, certain pedagogical differences have not been resolved or supported by documental experimentation, particularly at the high school level.

At the college level the language laboratory systems have greater possibilities for being used as a library-type experience. The library-type arrangement permits independent student usage, while the restrictive nature of the formalized high school program generally delimits such usage in a secondary school setting.

Objective evidence for assessing the advantages or disadvantages of the record-playback in each pupil station has not been available for school systems. Accordingly, school systems in their deliberations on evaluating what type of language laboratory system to purchase have very fragmentary findings on which to evaluate their selection. Consequently, in order to assess the relative merits of the audio-active system, the audio-active-record system, as well as selected combinations of the two systems, this project was undertaken with a group of high school sophomores in beginning French.

Objectives

This experiment was concerned with a longitudinal evaluation of the comparative merits of the audio-active and various arrangements of the record-playback facilities. The ma-

jor hypotheses tested were that no significant differences would occur in measuring four basic language facets with beginning French students. The four facets of language growth tested were pronunciation accuracy, comprehension of the spoken word, speaking fluency, and structural accuracy. The second and third hypotheses were made independently of the major hypotheses. Here it was postulated that no significant differences would occur among the groups when a standard test was utilized in measuring final outcomes of students in first-year French. The same hypotheses were used in making the assessment of student grades.

In addition to the major and minor hypotheses tested, it was also the purpose of this project to evaluate procedural difficulties with the language laboratory systems as well as the mechanical problems that occurred in the day to day use of the mechanical equipment.

PROCEDURE

The project involved 120 high school sophomores pursuing the college preparatory program and experiencing their first year with a modern foreign language, French. A preliminary investigation of the students revealed that nine of the 120 students had bilingual home environments. It was the initial intention to make four groups of 30 through the utilization of a table of random numbers. Due, however, to a team-teaching program, it was impossible to follow this procedure. Consequently, the guidance counselor, the high school principal, and the school project coordinator cooperatively evaluated student credentials and established the four required groups for the project. As a check on this procedure, six predictor variables were utilized to determine the comparability of the four groups. These variables were chronological age, mental age, intelligence quotient, reading age, School and College Ability Test (verbal section), and the Luria-Orleans Modern Language Prognosis Test.

The objective of the foreign language program at Easton Area High School is to give the student both a formal and functional mastery of his chosen language. The language laboratory was introduced to achieve this objective and to provide individual practice in listening and speaking while the teacher, through conventional instructional methods, emphasized reading comprehension, grammar, vocabulary, and writing.

One group (A) of 30 students received their beginning French instruction in a language laboratory equipped with audio-active equipment exclusively. A second group (B) of 30 students received their instruction in a language laboratory having the record-playback feature in each booth. A third group (C) of 30 students utilized the audio-active record laboratory, spending half of their laboratory time with audio-active equipment usage and half of the time using the record-playback feature. A fourth group (D) utilized 80 percent of the laboratory time with audio-active equipment; the remaining 20 percent of the laboratory time was utilized with audio-active-record equipment.

In order to equalize the equipment time distribution for the third group (C), it was found feasible to use a two-week period. One week the audio-active equipment was used and the following week the record-playback equipment was used.

The Easton Area High School has an eight-period day with each class period 40 minutes in length. Approximately 80 percent of the language instruction was devoted to conventional teacher instruction. The remaining 20 percent of the time constituted the experimental time during which the laboratory variations were employed.

Initial experiences for the students consisted of a one-week orientation period in the laboratory. Students received instruction on the use of activated headsets with microphones attached. The appropriate groups were shown how to use the tape recorders in the individual booths and given ample practice time in recording.

Prior to the language laboratory sessions, the teacher introduced the new conversation lesson in the classroom. Following this introduction and explanation by the teacher, the various language laboratory systems were utilized to reinforce the teacher's presentation. In the laboratory, students listened to the conversation on the console tape recorder and also followed it in the book. Student performances were monitored by the teacher. Laboratory

experience time varied in that additional portions of time were required for the record-playback feature. As part of the classroom setting vocabulary was reviewed. The out-of-class assignments consisted of writing the conversation and vocabulary as well as exercises related to the structure of the language. At the end of approximately ten days, dictation tests were given.

Group A listened to and repeated the conversation in the pauses once each day. Group B listened, repeated, recorded, and played back the conversation once each day. Group C followed the procedure for group A one week and that of group B the following week. Group D followed the procedure for Group A four days a week and that of group B one day a week.

The daily operational plan was so constructed in the experiment that it was possible to ascertain how much laboratory time was used and how much class time was used with a regular teacher-pupil relationship.

Evaluation procedures for the four facets of language growth were carried on in such a way that any chance for possible bias was eliminated. To do this, three foreign language specialists were employed to make independent numerical judgments of the four language facets every six weeks. This procedure was carried out in the following manner: At the end of every six-week period each student in the experiment was brought into a language laboratory booth and asked by the teacher to read a short paragraph of the material covered during the six-week period. The teacher then asked the student three questions. Two of the questions were related to the paragraph; the third was not related and required the student to construct a reply. These testing sessions were taped. Initially, each student required about one minute. The student's proficiency increased in each succeeding test session, until, by the last session, the student's taped time had increased from one minute to about three minutes. Each student was assigned a different code number each session in order that his name could not be associated with any one group. Since the taping sessions required more than one class session, alternate tests were given to avoid the possibility of students providing test information to other students the following class period.

These tapes were then mailed to Dr. Alfred D. Roberts, Chairman, Department of Foreign Languages, West Chester State College. Doctor Roberts played the tapes and recorded a numerical rating for each student on a uniform rating sheet for each one of the four facets of language growth. These rating sheets were forwarded to the Department of Public Instruction for coding and the student tapes were forwarded to Dr. Mario Maurin, Chairman of the Department of French, Bryn Mawr College. Doctor Maurin followed the same procedure of evaluation. After his work was completed, the tapes were forwarded to Dr. Samuel Pascal, Professor of Languages, Lafayette College, who in turn followed the same procedure of the two previous judges.

The sequence of tape listening was altered each period in order that the judges would not be listening to the same student at the same time sequence in each period. This procedure permitted independent evaluations by all three judges.

A rating scale of one to seven, low to high, was employed to rate student performance on each of the four aspects of language growth.

Prior to initiating this process of evaluation, an orientation program for the three judges was conducted in order to develop some degree of uniformity in evaluating the tapes. Although the use of a seven-point rating scale implied a high degree of orderliness in the

evaluation process, it was acknowledged that point spread differences among the judges would probably occur. In this orientation period sample tapes were judged in order that general agreement could be reached in terms of what constituted excellent language usage, average language usage, and language usage that was not acceptable.

Throughout the entire year no information on tape judging was given to any of the judges or the teacher. Accordingly, the tape values of each judge were completely independent of the teacher and of the other two judges.

THE STATISTICAL ANALYSIS

Sample

The generally accepted method in educational research is the random selection of a sample and random assignment of treatments to these groups. However, due to administrative limitations, random sample selection was not possible and existing class rosters were utilized. The possibility that these groups differed on relevant educational measures was considered and they were, therefore, compared on six variables for which data were available and which were possibly related to the program. These were chronological age, mental age, intelligence quotient as determined by the Otis Quick Scoring Test, reading age as measured by the Stanford Advanced Reading Test, School and College Ability Test (verbal section), and the Luria-Orleans Modern Language Prognosis Test. The data are summarized in Table 2.

The F ratio for significance of differences among groups revealed no significant differences at the five percent level for five of the six measures. There was, however, a significant difference at the five percent level in reading age favoring the audio-active record group. By utilizing the regression analysis technique, it was possible to compare the final results while making allowances for the initial differences.

Tape Recording Evaluation — F Ratio

The judges' ratings of the tapes on the four aspects of language skill summarized in Tables 2-6 constitute the basic data for the evaluation of the experimental results. Recognizing the possibility that the judges might differ in their individual evaluative criteria, a double classification, according to judge and instructional method, was employed. This technique assists in answering the following questions: (1) If allowance is made for differences among judges, are there significant differences among groups, as rated? (2) If allowance is made for differences among groups, do judges differ significantly in assigning ratings?

Although data was available for each of the grading periods, only the final one, the sixth report period, was analyzed using the F ratio. The justification for this procedure, in preference to averaging the ratings for all six periods, is two-fold. The first consideration concerns the variation of the criterion variable from period to period. The French passages used to test the students became progressively longer and more difficult as the year progressed. Consequently, student performance and judge rating were not founded on a common base. Secondly, the sixth period rating is logically the most relevant for evaluation purposes. Coming at the conclusion of the school year, it represents the final product of the respective methods. It reflects the accumulated effects of the total program and provides the most meaningful measure for comparison of the different methods.

It should be noted that the initial bias in reading age favoring the audio-active record group might indicate superiority in a measure which is relevant to the final achievement and thus prejudice the final results. Later analysis adjusts for this advantage.

The variance ratio for significance of differences among judges' mean scores, independent of differences among groups, indicates significance at the $.005 > P$ level.

The crucial question is whether or not the groups differ significantly justifying the conclusion that one method is superior to the other? Using the F ratio to analyze the data in Tables 3-6, the following results on each of four language skills were found:

1. Pronunciation Accuracy: There was a significant difference at .05>P>.01 level favoring the audio-active record group.

2. Comprehension of the Spoken Word: No significant difference at the five percent level was revealed.

3. Speaking Fluency: There was no significant difference at the five percent level.

4. Structural Accuracy: The difference was significant at .05>P>.01 level favoring the audio-active group.

A plausible explanation for the superior performance in pronunciation accuracy by the audio-active record group is the opportunity afforded the students to record and listen to their own voices. This exercise, following the master's voice provides the students with the necessary individual practice to develop proper pronunciation. That this superiority is not evident in the other areas examined is evidence of the need for specific practice in a given skill if it is to be mastered.

No explanation is available to explain the favorable ratings obtained by the audio-active on structural accuracy.

In view of the initial differences among the groups, one of which was statistically significant, a regression analysis technique was employed. This method obviates the need for having precisely matched pairs. The product-moment coefficients of correlation between the initial factors and judge ratings were calculated. The highest coefficient for each of the skills was chosen for insertion in the regression equation of end scores on matching scores. The final score for each group is predicted on the basis of its predictor. In this way it is possible to calculate the gain or loss relative to the predicted score for each group on the skills examined. These results are summarized in Table 9.[1]

This analysis revealed no significant gain at the five percent level. Hence, taking the initial difference into consideration suggests that the methods do not produce results that are significantly different.

Tape Recording Nonparametric Analysis

A cursory examination of Table 10 suggests that a non-parametric analysis might reveal that the different methods were, in fact, significantly different as measured by the judges' ratings.

This procedure is recommended because of the following consideration. Table 7 illustrates the high degree of variability present among the judge ratings. Thus, the reliability of the rating is open to question. Employing these ratings as rankings, there appears a remarkable degree of agreement among the judges. This suggests that a pooled rank analysis be employed to determine the significance of difference among the groups.

The Friedman two-way analysis of variance is appropriate with the six report periods tabulated as rows and the four methods as the columns. Although this test is designed to evaluate the results of related samples, the fact that the groups did not differ in five of the initial variables would make this test the most plausible.

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[1]This technique as it applies to individual student gain is discussed in C. C. Peters and W. R. V. Voorhis, *Statistical Procedures and Their Mathematical Basis* (N. Y.: McGraw Hill Book Co., Inc.), pp. 360-369. The authors indicated in a personal communication that the method is also applicable to group analysis.

This analysis reveals that in three of the four language skills there is a significant difference at the five percent level among the methods. The results are:

1. Pronunciation Accuracy: There is a significant difference at the .01>P>.005 level favoring the audio-active record group. Also, the 50 percent group ranked lowest in each of the six report periods.

2. Comprehension of Spoken Word: The difference is significant at about the one percent level favoring the 80-20 percent group. It is interesting to note that the audio-active record, which previously ranked highest, ranked last in five of the six report periods.

3. Speaking Fluency: The results show significance at the .05>P>.02 level favoring the 80-20 group.

4. Structural Accuracy: No significant difference was revealed at the five percent level. However, the fact that the results showed .10>P>.05 favoring the 80-20 group indicates that further experimentation might be justified.

Cooperative French Test

To insure that exposure to the different methods did not affect the student's performance on elementary level traditional skills, the French Test was administered to the four groups. This test is intended to test achievement in vocabulary grammar, and reading comprehension. No significant difference at the five percent level was revealed.

Teacher Grades

Finally, the groups were compared on over-all achievement as measured by the teacher's grades. Since the same teacher rated all groups the usual objection to this form of evaluation is not present. The fact that the teacher was unaware of the judge ratings provided an independent measure of pupil achievement. This analysis revealed no significant differences among the groups at the five percent level.

Teacher Statement

The use of taped conversations in the language laboratory gave the students the opportunity of hearing various native French voices, which was a most decided improvement in the teaching of French. Their pronunciation and intonation, as a whole, were better than the pronunciation and intonation of students in former years to whom such tapes were not available. The teacher of second-year French, who instructs these students, reports that their pronunciation is better than that of last year's French II students. The taped voices spoke at a normal rate, and the pauses between the phrases forced the students to increase their rate of speech. This helped eliminate the tendency of beginning students to speak too slowly.

The students were quite interested in learning how to operate the laboratory equipment and in being part of a new program. However, it was observed that the audio-active-record group seemed to become bored with frequent recording, whereas those who recorded once a week or every other week seemed more interested in the recording process throughout the entire year.

It is recommended that additional headsets be available to replace those that become inoperative. This avoids the loss of time which can occur when students cannot hear or record their voices because of faulty equipment.

IMPLICATIONS

Inferences

Considering the limited sample with which this study is concerned, the results obtained can, at best, serve as tentative findings to be verified by future investigations in which other school systems, a variety of teachers and students, as well as variations in laboratory time are considered. However, the results of this project can serve to refine the judgments made by school officials who are considering the use of language laboratories.

If the school has as its major purpose comparable growth rates for the four facets of language growth, then a combination of laboratory experiences utilizing 80 percent audio-active equipment and 20 percent audio-active-record equipment would seem to be a desirable relationship to follow in the utilization of language laboratory systems. If, however, pronunciation accuracy is the major objective of a foreign language program, then continuous record-playback in the laboratory seems essential. That the audio-active-record group does not necessarily achieve superior results in all aspects of language growth as measured by this project is attested to by the poor performance of the audio-active-record group on comprehension of the spoken word. It would seem that the gain in one skill is made at the expense of another. Consequently, the school administrator wishing to achieve superiority in pronunciation accuracy without risking poorer results in comprehension should adopt a more flexible scheduling procedure.

Furthermore, if future investigations corroborate these findings, an interesting guideline will be available to foreign language teachers. *There is an optimum period of time to be devoted to developing pronunciation accuracy which at the same time will produce satisfactory results in the other aspects of language skill.* Varying this period tends to have a negative effect on achievement in other language skills.

One practical approach to language laboratories might well be the installation of 24 or 30 pupil audio-active stations with six additional pupil stations (equipped with the record-playback feature) at the back of the room. A partition with adequate glass space separating the audio-active from the audio-active record equipment and having an entrance from the audio-active stations as well as an independent entrance from the hall might tend to facilitate independent student usage.

The language laboratory can be an effective instructional device in a school's foreign language program. However, it cannot be viewed as a separate segment or component of one department in a secondary school. To move toward the best utilization of such equipment may require a re-adaptation of class scheduling, length of class periods, and may even affect the basic objectives or goals of the total secondary school program. It is this kind of critical evaluation that will bring about a better image of the secondary school program.

Limitations

The limitations of this experiment consist of the following items:

1. The experiment was limited to only one school system with one teacher teaching all four classes.

2. This was the teacher's initial experience in the use of laboratory equipment. However, to compensate for this, a one-week program in the use of laboratory equipment was conducted by an expert preceding the opening of school.

3. Seventy to eighty percent of the students' language course was devoted to regular classroom instruction. This large block of regular instructional time might obscure the effects, if any, of the language laboratory variations investigated.

Recommendations for Future Research

In view of the large block of regular teacher time in this study, a bias may have been introduced influencing the results, independent of the laboratory variations utilized. Accordingly, greater differentiation of teacher-laboratory time is needed to determine the possible effects.

Furthermore, a study of the conventional program as a control would add depth to the findings in that it would allow for a comparison between conventional and laboratory methods as related to the functional aspects of language instruction. This forms the basis for the investigation being conducted at Easton during the current academic year under Title VII of the National Defense Education Act.

Also, in addition to a multitude of studies needed to investigate the effects of variations in class size, teacher and student ability, and types of school systems, future research in language laboratory instruction would do well to concern itself with clearly defining the teacher's role as it emerges from the introduction of this new tool. What are the most effective ways in which the teacher's talents can be utilized? These questions become even more pressing if the introduction of programmed instruction is considered in conjunction with the language laboratory. It is entirely conceivable that an effective program will do a creditable job in teaching the structured aspects of language with the laboratory assisting in the functional area.

Investigators might consider the results of the regression technique in future studies. The SCAT verbal score seems to be a fairly good predictor of achievement in three of the judged skills; namely, pronunciation accuracy, comprehension of the spoken word, and speaking fluency. Structural accuracy is reliably predicted from the IQ score. These results are contingent upon verification by other studies, but the magnitude of the correlation coefficient .891 is worthy of further study.

Only careful research considering these questions and related ones will indicate clearly the nature of the language program of the future.

APPENDIX

This appendix is designed to provide the statistical background detail and other related materials essential to the operational phases of the project.

A. Statistical Tables

1. Instructional Time Sequence for the Lee Language Study
2. Six Group Measures According to Averages and Standard Deviations for the Four Experimental Groups
3. Average Judge Scores and Ranks for Pronunciation Accuracy for Each of Six Periods
4. Average Judge Scores and Ranks for Comprehension of Spoken Word for Each of Six Periods
5. Average Judge Scores and Ranks for Speaking Fluency for Each of Six Periods
6. Average Judge Scores and Ranks for Structural Accuracy for Each of Six Periods
7. Analysis of Variance of Four Language Skills
8. Product-Moment Correlation of Sixth Period Judge Scores with Initial Predictor Variables for the Four Facets of Language Growth
9. Observed Gains of Four Experimental Groups on Four Final Tests
10. Relative Ranks Within Each of Four Measures for the Group Standing for Each of the Six Testing Periods

B. Judges Rating Form

C. The Taped Tests

D. Teacher Profile

E. The Language Laboratory

F. Abstract of Original Proposal

TABLE 1

INSTRUCTIONAL TIME SEQUENCE FOR THE LEE LANGUAGE STUDY

Rating Period	Total Time in Minutes*	Percent of Teacher Time and Laboratory Time for Each of the Four Methods							
		A**		B**		C**		D**	
		Teacher Time	Laboratory Time	Teacher Time	Laboratory Time	Teacher Time	Laboratory Time	Teacher Time	Laboratory Time
First	960	83	17	73	27	78	22	79	21
Second	1 000	85	15	75	25	81	19	82	18
Third	960	79	21	74	26	81	19	81	19
Fourth	1 080	79	21	76	24	75	25	77	23
Fifth	1 040	85	15	76	24	81	19	82	18
Sixth	920	84	16	75	25	80	20	84	16
Total	5 960	82	18	75	25	79	21	81	19

*Does not include time for tape testing, teacher tests, and orientation.

**In tables 1 through 10 where letters A, B, C, and D appear:

A refers to the group using the audio-active laboratory equipment.

B refers to the group using the audio-active-record laboratory equipment.

C refers to the group using audio-active equipment 50 percent of the time, and audio-active-record equipment 50 percent of the time.

D refers to the group using audio-active equipment 80 percent of the time, and audio-active-record equipment 20 percent of the time.

TABLE 2

SIX GROUP MEASURES ACCORDING TO AVERAGES AND STANDARD DEVIATION FOR THE FOUR EXPERIMENTAL GROUPS

Measures		Group A	Group B	Group C	Group D
Chronological Age	Mean	14.73	14.71	14.77	14.71
	S. D.	.28	.24	.38	.34
	N.	29	30	29	27
Mental Age	Mean	16.96	17.38	17.41	17.20
	S. D.	1.22	1.17	1.33	1.43
	N.	29	30	29	27
Intelligence Quotient	Mean	115.17	118.32	117.87	116.87
	S. D.	8.32	8.6[illegible]	8.13	9.71
	N.	29	30	29	27
SCAT Verbal Score	Mean	270.97	274.36	273.59	272.44
	S. D.	7.95	10.12	12.48	11.37
	N.	29	30	29	27
Reading Age	Mean	16.09	16.79	16.41	15.99
	S. D.	.96	.77	1.15	1.31
	N.	29	30	29	27
Luria-Orleans Modern Language Prognosis Test	Mean	133.40	136.04	131.37	132.60
	S. D.	11.34	12.88	17.08	21.53
	N.	29	30	29	27

TABLE 3

AVERAGE JUDGE SCORES AND RANKS FOR PRONUNCIATION ACCURACY FOR EACH OF SIX PERIODS

Groups	Periods											
	First	Rank	Second	Rank	Third	Rank	Fourth	Rank	Fifth	Rank	Sixth	Rank
A	3.033	2	2.467	2	2.678	2	2.920	2	2.931	3	3.057	3
B	3.178	1	2.622	1	2.822	1	3.011	1	3.222	1	3.311	1
C	2.478	4	2.156	4	2.600	4	2.711	4	2.713	4	2.851	4
D	2.489	3	2.393	3	2.631	3	2.802	3	2.951	2	3.136	2

TABLE 4

AVERAGE JUDGE SCORES AND RANKS FOR COMPREHENSION OF SPOKEN WORD FOR EACH OF SIX PERIODS

Groups	Periods											
	First	Rank	Second	Rank	Third	Rank	Fourth	Rank	Fifth	Rank	Sixth	Rank
A	3.444	1	2.033	3	2.144	3	2.368	4	2.517	2	3.138	2
B	3.033	4	1.856	4	1.978	4	2.522	2	2.233	4	2.944	4
C	3.222	3	2.189	2	2.156	2	2.411	3	2.287	3	3.115	3
D	3.267	2	2.381	1	2.667	1	2.938	1	3.000	1	3.519	1

TABLE 5

AVERAGE JUDGE SCORES AND RANKS FOR SPEAKING FLUENCY FOR EACH OF SIX PERIODS

Groups	Periods											
	First	Rank	Second	Rank	Third	Rank	Fourth	Rank	Fifth	Rank	Sixth	Rank
A	3.400	1	2.122	3	2.311	2	2.632	3	2.621	2	3.138	2
B	3.256	2	2.033	4	2.033	4	2.767	2	2.478	3	2.856	4
C	3.003	4	2.244	2	2.200	3	2.556	4	2.299	4	2.943	3
D	3.211	3	2.429	1	2.690	1	2.889	1	3.049	1	3.185	1

TABLE 6

AVERAGE JUDGE SCORES AND RANKS FOR STRUCTURAL ACCURACY FOR EACH OF SIX PERIODS

Groups	Periods											
	First	Rank	Second	Rank	Third	Rank	Fourth	Rank	Fifth	Rank	Sixth	Rank
A	3.144	2	2.122	3	2.122	2	2.517	3	2.483	3	3.092	1
B	3.178	1	2.056	4	1.889	4	2.667	2	2.489	2	2.744	3
C	2.911	4	2.178	2	2.067	3	2.433	4	2.230	4	2.598	4
D	2.956	3	2.214	1	2.440	1	2.741	1	2.802	1	2.753	2

TABLE 7

ANALYSIS OF VARIANCE OF FOUR LANGUAGE SKILLS

Language Facets	Group	Means	Sources of Variation	Degrees of Freedom	Sum of Squares	Variance Estimate	F Ratio
Pronunciation Accuracy	A	3.057	Judges	2	129.7	64.9	64.5*
	B	3.425	Groups	3	9.6	3.2	3.2*
	C	2.851	Within	339	340.8	1.0053	—
	D	3.136	Total	344	480.1	—	—
Comprehension of Spoken Word	A	3.138	Judges	2	205.5	102.8	52.6*
	B	2.944	Groups	3	14.8	4.9	2.5
	C	3.115	Within	339	661.6	1.952	—
	D	3.519	Total	344	881.9	—	—
Speaking Fluency	A	3.138	Judges	2	220.0	78.6	56.2*
	B	2.856	Groups	3	6.3	1.516	1.1
	C	2.943	Within	339	474.4	1.399	—
	D	3.185	Total	344	700.7	—	—
Structural Accuracy	A	3.092	Judges	2	138.3	69.2	57.9*
	B	2.744	Groups	3	11.4	3.8	3.2*
	C	2.598	Within	339	405.0	1.1948	—
	D	2.753	Total	344	554.7	—	—

*Statistically significant at the .05 level.

TABLE 8

PRODUCT-MOMENT CORRELATION OF SIXTH PERIOD JUDGE SCORES WITH INITIAL PREDICTOR VARIABLES FOR THE FOUR FACETS OF LANGUAGE GROWTH

Initial Predictor Variables	Pronunciation Accuracy	Comprehension of Spoken Word	Speaking Fluency	Structural Accuracy
Chronological Age	—.155	—.121	—.202	—.142
Mental Age	.467	.241	.309	.304
Intelligence Quotient	.511	.361	.339	.891
SCAT Verbal Score	.560	.433	.434	.417
Reading Age	.432	.309	.344	.319
Luria-Orleans Prognosis Test	.416	.361	.396	.330

TABLE 9

OBSERVED GAINS OF FOUR EXPERIMENTAL GROUPS ON FOUR FINAL TESTS

Language Facets	Groups	Estimated Gain	Actual Gain	Gain of Actual Over Estimated Gain
Pronunciation Accuracy	A	−.108	−.033	+.075
	B	+.105	+.221	+.116
	C	+.056	−.239	−.295
	D	−.016	+.046	+.062
Comprehension of Spoken Word	A	−.107	−.033	+.074
	B	+.104	−.227	−.331
	C	+.056	−.056	−.112
	D	−.016	+.348	+.364
Speaking Fluency	A	−.101	+.112	+.213
	B	+.098	−.170	−.268
	C	+.053	−.083	−.136
	D	−.015	+.159	+.174
Structural Accuracy	A	−.164	+.295	+.459
	B	+.166	−.053	−.219
	C	+.107	−.199	−.306
	D	−.021	−.044	−.023

TABLE 10

RELATIVE RANKS WITHIN EACH OF FOUR MEASURES FOR THE GROUP STANDING FOR EACH OF THE SIX TESTING PERIODS

Groups	Pronunciation Accuracy						Comprehension of Spoken Word						Speaking Fluency						Structural Accuracy					
	Periods						Periods						Periods						Periods					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
A	2	2	2	2	3	3	1	3	3	4	2	2	1	3	2	3	2	2	2	3	2	3	3	1
B	1	1	1	1	1	1	4	4	4	2	4	4	2	4	4	2	3	4	1	4	4	2	2	3
C	4	4	4	4	4	4	3	2	2	3	3	3	4	2	3	4	4	3	4	2	3	4	4	4
D	3	3	3	3	2	2	2	1	1	1	1	1	3	1	1	1	1	1	3	1	1	1	1	2

B. JUDGES RATING FORM

Student Number_____ Rating Period_____

RATING SCALE

7 – OUTSTANDING LANGUAGE USAGE

6 – EXCELLENT LANGUAGE USAGE

5 – GOOD LANGUAGE USAGE

4 – AVERAGE LANGUAGE USAGE

3 – ACCEPTABLE LANGUAGE USAGE

2 – PARTIALLY ACCEPTABLE LANGUAGE USAGE

1 – NOT ACCEPTABLE LANGUAGE USAGE

	7	6	5	4	3	2	1	
Pronunciation Accuracy								
Comprehension of Spoken Word								
Speaking Fluency								
Structural Accuracy								
Totals								

C. THE TAPED TESTS

Test #1

Read:

Je suis assis dans un fauteuil; je fume ma pipe. Ma femme aussi est assise; elle lit un livre. Marie est debout près de la fenêtre; elle caresse le gros chien, et regarde le chat. Pierre est à genoux sur le plancher; il joue avec son train.

Question:

1. Qui lit un livre?
2. Où est Marie?
3. Que fait Pierre?

Test #2-A

Read:

La plupart des gens, à Paris, habitent des appartements, mais nous, nous demeurons en banlieue, dans une petite villa. Elle comprend deux étages: le rez-de-chaussée et le premier étage. Au rez-de-chaussée il y a deux grandes pièces: la salle à manger et le salon, ainsi que le vestibule d'entrée et la cuisine. Les chambres à coucher, la salle de bains et les cabinets sont au premier.

Answer:

1. Où demeurent la plupart des gens?
2. Quelles pièces sont au premier étage?
3. A quelle heure arrivez-vous à l'école? (7:30–8:30)
   Acceptable

Test #2-B

Read:

Derrière la maison il y a un autre jardin plus grand avec une pelouse et quelques arbres fruitiers. Il y a aussi un jardin potager, où nous cultivons toutes sortes de légumes: pommes de terre, oignons, tomates, choux-fleurs, et beaucoup d'autres encore.

Answer:

1. Où sont les arbres fruitiers?
2. Qu'est-ce que vous cultivez dans le jardin potager?
3. A quelle heure quittez-vous l'école? (3:10 on)
   Acceptable

Test #3-A

Read:

En entrant dans le salon, nous voyons d'abord en face de nous, entre la fenêtre et la cheminée, un piano. Devant le piano il y a un tabouret: à droite du piano le casier à musique, à gauche un lampadaire électrique.

Question:

1. Que voyons-nous d'abord?
2. Où sont le casier à musique et le lampadaire?
3. Combien de classes avez-vous chaque jour?

Test #3-B

Read:

Face à la cheminée il y a un grand divan avec des coussins. Au milieu de la pièce, se trouve la table à thé: tout près il y a un grand fauteuil confortable. Un épais tapis recouvre tout le parquet.

Question:

1. Y a-t-il quelque chose sur le divan?
2. Où sont la table à thé et le fauteuil?
3. Où allez-vous après les classes chaque jour?

Test #4-A

Read:

Samedi après-midi. On sonne: ce sont nos voisins, M. et Mme Gauthier, qui viennent nous voir. La bonne ouvre la porte, les fait entrer, referme la porte et les introduit au salon. Nous les accueillons avec les mots aimables habituels, nous leur serrons la main, et les faisons asseoir.

Question:

1. Quel jour est-ce?
2. Qui vient à la porte et introduit les Gauthier au salon?
3. Combien font quarante et dix?

Test #4-B

Read:

La bonne apporte sur un plateau tout ce qu'il faut pour le thé: la théière, des tasses et des soucoupes, de l'eau chaude, un pot de lait, du sucre, ainsi que des petits fours et des gâteaux. Ma femme verse le thé, et ma nièce le sert. Elle passe aussi les gâteaux.

Question:

1. Qu'est-ce que les gens mangent avec le thé?
2. Qui sert le thé et les gâteaux?
3. Combien font sept fois huit?

Test #5-A

Read:

Les Clavel sont des amis à nous. Ils habitent juste à côté de chez nous une maison à peu près pareille à la nôtre. Mais notre salon est plus grand que le leur, et il contient plus de meubles. Dans ce salon-ci, comme vous voyez sur la gravure, il ne se trouve pas de bibliothèque. La mienne est dans mon salon, mais celle de M. Clavel est dans son cabinet de travail.

Answer:

1. Où demeurent les Clavel?
2. Dans quelle pièce est la bibliothèque de M. Clavel?
3. Quel temps fait-il en hiver?

Test #5-B

Read:

Vous pouvez voir également que les Clavel ont un piano à queue, bien plus beau que notre simple piano droit. Mme Clavel et ma femme aiment beaucoup la musique et toutes les deux jouent très

bien du piano. Ma femme a un grand nombre de morceaux de musique qu'elle range dans un casier spécial, tandis que Mme Clavel met les siens dans des cartons.

Answer:

1. Qu'est-ce que les deux femmes font très bien?
2. Où se trouvent les morceaux de musique de Mme Clavel?
3. Quel temps fait-il en été?

Test #6-A

Read:

M. et Mme Pascal, de passage à Paris, sont venus dîner chez les Garnier. La table est recouverte d'une nappe blanche. La bonne a mis le couvert: chaque convive a son assiette, sa cuillère et sa fourchette, son couteau et ses verres, grands et petits. On n'a pas oublié le sel et le poivre, l'huile et le vinaigre, ni surtout la moutarde. Chacun a sa serviette et son petit pain.

Questions:

1. Où sont venus les Pascal?
2. Qu'est-ce que la bonne a fait?
3. Où allez-vous quand vous voulez acheter du pain?

Test #6-B

Read:

Devant le maître de maison il y a le service à découper. La maîtresse de maison vient de servir le potage. Puis il y aura le poisson, un ou deux plats de légumes, un rôti servi avec la salade, et après les fromages variés, le dessert, gâteaux et fruits de toutes sortes. Pour finir on servira le café et les liqueurs.

Question:

1. Où est le service à découper?
2. Qu'est-ce que la maîtresse de maison a fait?
3. Où allez-vous quand vous voulez acheter des légumes?

D. TEACHER PROFILE

Isabel M. Petro received a Bachelor of Arts degree in 1958 from Moravian College. Bethlehem, Pennsylvania. Her major areas of preparation were in French and Spanish.

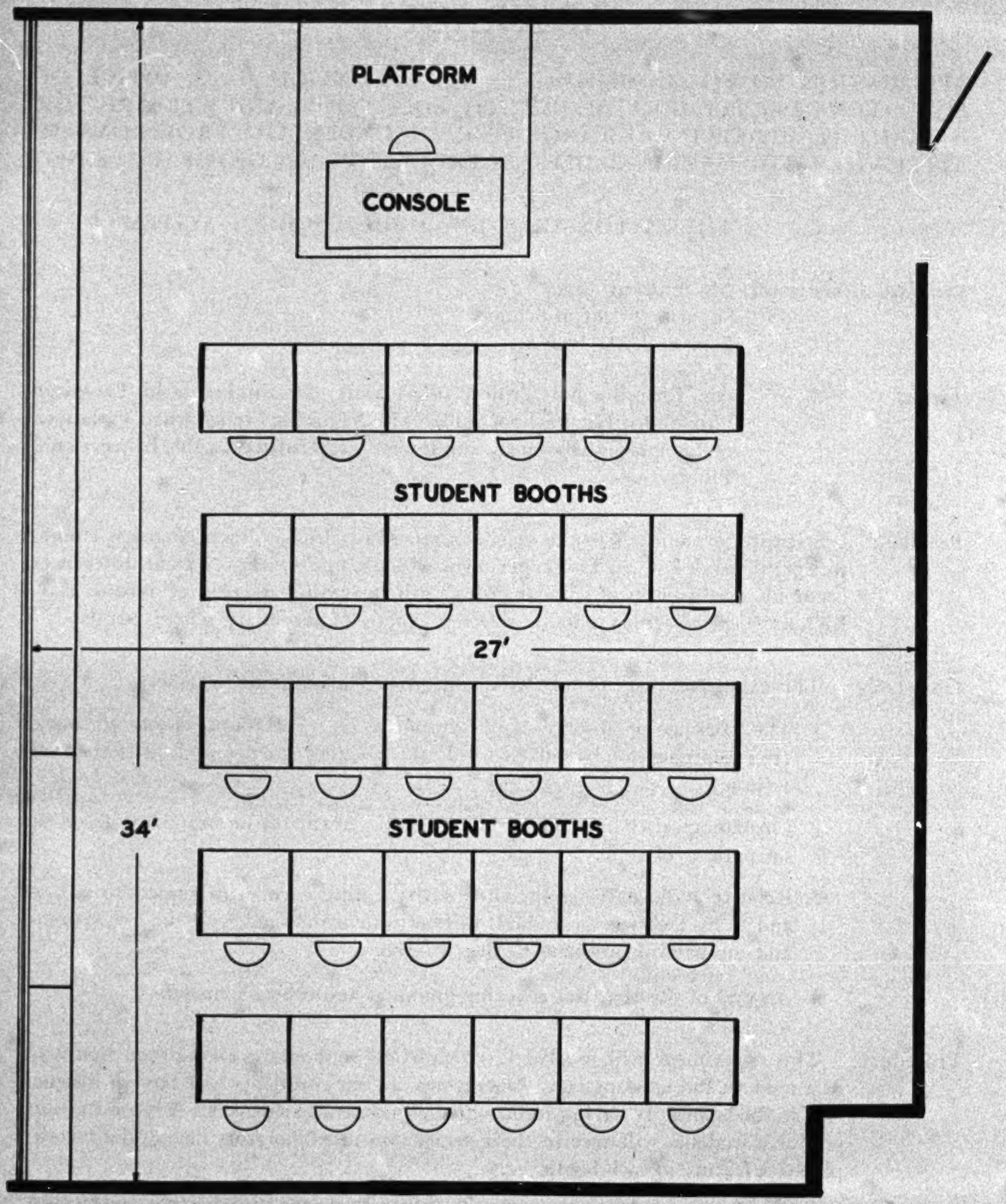
She has taken advanced work in French at Lehigh and Columbia Universities. The work taken at Columbia University placed its emphasis on language laboratory programs and equipment.

She is presently working toward a Master of Arts degree from Temple University, Philadelphia, Pennsylvania.

E. THE LANGUAGE LABORATORY

Teacher Console

Student Booth



LANGUAGE LABORATORY

ABSTRACT

APPLICATION TO THE COMMISSIONER OF EDUCATION, U. S. OFFICE OF EDUCATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, FOR A GRANT TO SUPPORT A RESEARCH PROJECT UNDER THE PROVISIONS OF TITLE VII OF THE NATIONAL DEFENSE EDUCATION ACT OF 1958 (P. L. 85-864)

Submitted by: THE EASTON AREA JOINT HIGH SCHOOL SYSTEM

Principal Investigator: Mr. Edward Tracy
Superintendent of Schools
Easton, Pennsylvania

Title: An Experimental Project to Measure Certain Facets of Language Growth for High School Students in Beginning French when Variations of Language Laboratory Equipment are Utilized in the Instructional Process.

Problem: Scientific evidence as to the merits of record-playback in each language laboratory booth is not known. This experiment will attempt to measure what differences occur in certain facets of student growth when varying degrees of record playback are utilized with randomly selected groups of secondary school pupils.

Objectives: This experiment will primarily be concerned with four main factors:

1. The presence or absence of improvement of (a) pronunciation accuracy, (b) comprehension of spoken word, (c) speaking fluency and (d) structural accuracy.
2. Chronological changes as to rate of improvement of the four basic facets at six periods of time.
3. Relative audio-active and record playback differences with respect to a, b, c and d in 1 above, procedural difficulties encountered with the two systems and mechanical problems of the two systems.
4. An end of the year test covering grammar and comprehension.

Procedure: This experiment will involve 120 high school sophomores taking their first year of a modern foreign language. One group of thirty students will receive instruction in the laboratory having audio-active equipment exclusively. A second group of thirty students will receive their instruction in a laboratory having the record-playback feature in each booth.

A third group of thirty students will utilize both the audio-active and record playback; spending half of the time with each type of equipment, and within the

same time limits prescribed for the other groups. A fourth group of thirty students will utilize the record playback feature twenty percent of the time and the audio-active eighty percent of the time.

One foreign language teacher will serve as instructor for all four groups. All four groups will receive the same portion of time in the language laboratory.

Periodic tapes of each individual student's progress will be made and evaluated independently by three language specialists. Data obtained from these evaluations on a numerical scale will serve as one of the sources for statistical measurement.

ABSTRACT

An Experimental Project To Measure Certain Facets Of Language Growth For High School Students In Beginning French When Variations Of Language Laboratory Equipment Are Utilized In The Instructional Process

John N. Buch, Specialist
Bureau of Research
Department of Public Instruction
Harrisburg, Pennsylvania

Problem

This experiment is an attempt to determine the optimum method for the incorporation of the language laboratory in the conventional foreign language program at the secondary school level. Traditionally, the classroom teacher, employing lectures, practice exercises, classroom recitations, and paper-pencil tests, teaches both the formal and functional skills of a foreign language. The formal refers to the grammar, vocabulary, reading and writing skills; whereas, the functional includes listening, comprehension, and the ability to converse.

The advent of the language laboratory is a promising development in the field of modern foreign language instruction insofar as it contributes a more effective tool for teaching the functional aspect. Several options are available which provide different amounts of time for the use of laboratory equipment.

The audio-active system consists of a microphone and earphones at each pupil station. As the student hears the desired

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This study was conducted at The Easton Area High School, Easton, Pennsylvania and supported in part by Title VII Grant, No. 736148, U. S. Office of Education, Washington D. C.

speech pattern that has emanated from the teacher's console through the student's earphones, pauses are provided for the student to respond. The student's response is transmitted from the microphone to the earphones almost instantaneously.

In the audio-active record system a tape recorder is an additional component of each pupil station. The correct speech pattern, as well as the student's response, is recorded. This play-back feature permits the student to compare his speech pattern with that of the master's.

The basic advantage of the language laboratory, independent of the specific variation, is the opportunity afforded each student to practice every lesson. These practice sessions with authentic native voices permit the student to acquire proper accents and intonations and thus develop a keener ear for the language.

However, the determination of the specific system, which will produce the optimum results, has not as yet been made and was the subject of this investigation.

Procedure

Each of four foreign language classes, comparable in five out of six relevant measures, utilized a different variation of the language laboratory. The conventional program, taught by the same teacher to all four classes, accounted for about eighty percent of the instructional time. Twenty percent of the time constituted the experimental program.

One group (A) of thirty pupils utilized the audio-active equipment exclusively, while a second group (B) of thirty students utilized the audio-active record equipment exclusively. A third group (C) of thirty students divided its time equally between the two systems and a fourth group (D) of thirty students utilized the audio-active facility eighty percent of the time and the audio-active record facility twenty percent of the time.

At the end of each six-week period the following testing procedure was established. Each student would read a passage relevent to the material covered during the preceding period. The teacher asked two questions about this material and a third question unrelated to the passage read by the student. The passage read, as well as the responses to the three questions, were tape-recorded.

At the end of each six-week period, the tapes were routed to three college professors of Romance language who made independent evaluations of each student's tape. A scale of 1-7, low to high, was devised to rate the performances on pronunciation accuracy, comprehension of the spoken word, speaking fluency and structural accuracy.

As a final comparison, teacher grades and scores on the Cooperative French Test were evaluated.

Findings

The analysis of variance technique utilizing the sixth period judge scores revealed the following results:

1. Pronunciation Accuracy: There was a significant difference at the .05 level favoring the audio-active record group (B).

2. Comprehension of the Spoken Word: No significant difference among the groups was revealed.

3. Speaking Fluency: There was no significant difference at the .05 level.

4. Structural Accuracy: There was a significant difference at the .05 level favoring the audio-active group (A).

In view of the initial differences among the groups, one of which was statistically significant, a regression analysis technique designed to consider initial differences revealed no significance among the four experimental groups.

Considering the group mean scores for each of the six periods as rank measures, the Friedman two-way analysis of variance revealed the following results:

1. Pronunciation Accuracy: The difference is significant at the .01 level favoring the audio-active record group (B).

2. Comprehension of the Spoken Word: The difference is significant at the .01 level favoring the fourth group (D).

3. Speaking Fluency: The difference is significant at the .05 level favoring the fourth group (D).

4. Structural Accuracy: No significant difference was revealed.

An analysis of the teacher grades as well as the results from the Cooperative French Test revealed no significant differences.

Implications

The overall best performance was achieved by the fourth group (D). Practically, this information would support a language laboratory with 24 or 30 pupil stations equipped with audio-active equipment and about six additional pupil stations equipped with audio-active record equipment.

Locating record playback facilities in the back of the laboratory, and possibly set apart by a glass partition, could facilitate independent student usage when regular language classes are small.

The results of the audio-active record group also suggest that devoting total laboratory time to the record procedure, while effective in developing pronunciation accuracy, deprives the student of the time necessary to develop other functional language skills.